

Patent claims

1. Vehicle steering mechanism for motor vehicles with a steering handle that can be operated by the driver, as well as a positioning assembly coordinated with the steered vehicle wheels, which assembly is effectively connected with the steering handle and by means of which assembly the steered vehicle wheels can be swiveled by means of additional elements, such as tie rods and a steering arm, for example, in order to set a specifically desired steering angle, if necessary, and which positioning assembly is a hydraulic assembly with two hydraulic chambers which are divided by a hydraulic piston and can be stressed by the pressure of a hydraulic pressure source, **characterized in that**, the hydraulic assembly can be connected with the hydraulic pressure source or with a pressure medium supply container, as the case may be, by means of a valve unit, and that, a steering support can be adjusted by means of the valve unit.
2. Vehicle steering mechanism in accordance with claim 1, **characterized in that**, the valve unit has a hydraulic slide valve, by means of which a steering support is controlled through a continuous adjustment of a pressure difference between the two hydraulic chambers.
3. Vehicle steering mechanism in accordance with claim 2, **characterized in that**, the valve unit is a continuously adjustable slide valve with three final switching positions, with a first final switching position in which a pressure medium can be introduced into the two hydraulic chambers and/or can be removed from the two hydraulic chambers, with a second final switching position, in which the pressure medium can be introduced into a first hydraulic chamber and can be removed from a second hydraulic chamber, and with a third final switching position, in which the pressure medium can be removed from the first hydraulic chamber and can be introduced into the second hydraulic chamber.
4. Vehicle steering mechanism in accordance with claim 3, **characterized in that**, the hydraulic slide valve of an electrical actuator can be continuously adjusted between the different final switching positions through a linear movement of a valve gate, preferably by means of a servodrive unit and a gear or electromagnet, if applicable.
5. Vehicle steering mechanism in accordance with claim 4, **characterized in that**, a distance sensor is provided for the hydraulic slide valve, by means of which [sensor] the linear movement of the valve gate is determined.
6. Vehicle steering mechanism in accordance with one of the claims 2 to 5, **characterized in that**, the hydraulic slide valve has control edges, by means of which a specific pressure difference between the two hydraulic chambers is adjusted continuously during a linear movement of the valve gate.

7. Vehicle steering mechanism in accordance with claim 1, **characterized in that**, the valve unit has at least four analogized valves, preferably 2 flow-free closed (SG) and 2 flow-free open (SO) analogue valves, or valves which can be operated in an analogous manner, for the purpose of controlling the pressure in both of the hydraulic chambers.
8. Vehicle steering mechanism in accordance with one of the claims 1 to 7, **characterized in that**, a safety valve is provided, by means of which the two hydraulic chambers can be directly connected with one another.
9. Vehicle steering mechanism in accordance with claim 8, **characterized in that**, a hydraulic slide valve, which can be switched into different switching positions by means of 2 hydraulic valves through a linear movement of a safety valve switching element, is provided as a safety valve.
10. Vehicle steering mechanism in accordance with one of the claims 1 to 9, **characterized in that**, 2 hydraulic pressure sensors are provided, by means of which the hydraulic pressure in the 2 hydraulic chambers is determined, and that, a steering support can be adjusted in accordance with the pressures determined.
11. Vehicle steering mechanism in accordance with one of the claims 1 to 10, **characterized in that**, a torque sensor is provided, which determines the torque on a steering wheel shaft of the vehicle steering mechanism, and that, a steering support can be adjusted in accordance with the torques determined.
12. Vehicle steering mechanism in accordance with one of the claims 1 to 11, **characterized in that**, the steering mechanism is a steering mechanism with an open center ("open center steering mechanism") in which, in a neutral position of the steering mechanism -- that is to say, with the steering wheel in the straight-ahead position --, essentially no pressure difference is present between the chambers divided by the hydraulic piston, and that, the hydraulic pressure source has a pump which is connected with the drive motor of the motor vehicle by means of a drive unit, preferably a belt drive unit.
13. Vehicle steering mechanism in accordance with one of the claims 1 or to 11, **characterized in that**, the steering mechanism is a steering mechanism with a closed center ("closed center steering mechanism"), in which, in a neutral position of the steering mechanism -- that is to say, with the steering wheel in the straight-ahead position --, a hydraulic pressure or a pressure difference can essentially be present in the chambers divided by the hydraulic piston, and that, the hydraulic pressure source has a pump which can be connected with the motor vehicle drive unit by means of a coupling unit and by means of a drive unit, preferably a belt drive.

14. Vehicle steering mechanism in accordance with claim 12 or 13, **characterized in that**, the hydraulic pressure source has a high pressure reservoir, and that, the pump is operated in order to load the high pressure reservoir.
15. Vehicle steering mechanism in accordance with claim 14, **characterized in that**, a hydraulic pressure sensor is provided, and that, the hydraulic pressure in the high pressure reservoir is determined by means of the pressure sensor.

Summary

Vehicle steering mechanism

In a vehicle steering mechanism for motor vehicles, with a steering handle that can be operated by the driver, as well as a positioning assembly coordinated with the steered vehicle wheels, which assembly is effectively connected with the steering handle and by means of which assembly the steered vehicle wheels can be swiveled by means of additional elements in order to set a specifically desired steering angle, and which positioning assembly is a hydraulic assembly with two hydraulic chambers which are divided by a hydraulic piston and can be stressed by the pressure of a hydraulic pressure source, the hydraulic assembly can be connected with the hydraulic pressure source or with a pressure medium supply container, as the case may be, by means of a valve unit, and a steering support can be adjusted by means of the valve unit.

(Figure 2)

[Terms in the diagrams]:

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|-----------------------|---|--------------------|
| (23) CAN (Fahrzeug) | = | CAN (Vehicle). |
| (40) Fremdansteuerung | = | Outside actuation. |